4799

RENEWAL OF PERMITS TO OPERATE-THIRTEEN STORAGE TANKS-AT THE FEMP (OEPA) NO. 1431110128 T021, T022, T023, T024, T025, T026, T027, T102, T103, T104, T106, T107, T127

9/23/93

C:RP:93-0171
FERMCO/OEPA
60
PERMIT AP

Fernald Environmental
FERMCO
Restoration Management Corporation P.O. Box 398704 Cincinnati, Ohio 45239-8704 (513) 738-6200

479 9

September 23, 1993

U. S. Department of Energy
Fernald Environmental Management Project
Letter No. C:RP:93-0163

Mr. Peter Sturdevant
Compliance Specialist
Hamilton County Department
of Environmental Services
Air Quality Management Division
1632 Central Parkway
Cincinnati, Ohio 45210

Dear Mr. Sturdevant:

RENEWAL OF PERMITS TO OPERATE - THIRTEEN STORAGE TANKS - AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (OEPA) NO. 1431110128 T021, T022, T023, T024, T025, T026, T027, T102, T103, T104, T106, T107, AND T127

Enclosed please find the renewal applications for the thirteen storage tanks at the FEMP for which the Permits to Operate are scheduled to expire. A check for $195.00 is enclosed to cover the application fees.

Please contact Ervin Fisher of my staff at (513) 738-6053 if you have any questions about these applications.

Sincerely,

for Kenneth L. Alkema
Vice President
Regulatory Programs

KLA:EF:mhv
Attachments

0001

Fernald Environmental
FERMCO
Restoration Management Corporation

cc: S. M. Beckman, FERMCO - w/o attachments
R. W. Bischoff, FERMCO - w/o attachments
Robert Mendelsohn, DOE Contract Specialist
W. J. Quaider, DOE- FN
P. B. Spotts, FERMCO - w/o attachments
AR Coordinator
PR Files
File Record Storage Copy 108.6

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4799

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald City | Hamilton County | 45030 Zip

Cincinnati City | OH State | 45239-8705 Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T021
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
_____ Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix _____
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank D1-10
3. Your identification for Source (same as used on appendix): FEMP # 2-010

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0003

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____

Application No._____/_____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T021
FEMP ID NO. 02-010

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number D1-10 (FEMP 2-010) EP2-003 Date Installed 1952 (month/year)

2. Tank capacity: 3,300 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 7' Height 11'6" Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank: [ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [ ] Outdoors [X] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank. N/A

[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.

a) Type of vapor control system Bubble Cap Tower
Manufacturer Custom Make or model N/A
Date installed (month and year) 1954

b) Date tank was equipped with or vented to vapor control system (month & year) UNK

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: NOx 88.9% (DATA PREVIOUSLY SUBMITTED)
(Attach calculations and test data to support response, unless previously submitted)

0003

DOE - FEMP 479 9

(Facility Name)
D1-10 (FEMP 2-010)
(tank identification)

11. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~9.0 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution 0.29 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1987

g) Annual throughput of material: 600,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 17, 1993

0004

Storage Tank
Emission Report
Thursday, September 16 1993

10:25 AM

---- Tank Characteristics ----

Identification

Identification No.:	T021
City:	Dayton
State:	Ohio
Company:	DOE FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	12
Diameter (ft):	7
Liquid Height (ft):	12
Volume (gallons):	3300
Turnovers:	180
Net Throughput (gal/yr):	600000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

479 9

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	0.00
Vapor Space Volume =	0.00
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	1.000000
Total Standing Losses =	0.00

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	600000
Liquid Volume (cubic feet) =	462
Turnovers =	174
Turnover Factor =	0.3394
Working Loss Product Factor =	1.00
Total Working Losses =	19.83

---- Storage Tank Total Losses (AP-42) ----
Total losses = 19.83 lbs/year

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{19.83 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 1.19 \text{ E-7 lb U/year}$

Maximum Emissions: 1.19 E-7 lb U/year x 5 = 5.95 E-7 lb U/year

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE AN AIR CONTAMINANT SOURCE

4799

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45239-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T022
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank D1-11
3. Your identification for Source (same as used on appendix): FEMP #2-011

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature*
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0008

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____
Application No._____/_____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 TC
FEMP ID NO. 02-C

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number D1-11 (FEMP 2-011) / EP2-003 Date Installed 1952 (month/year)

2. Tank capacity: 3,300 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 7' Height 11'6" Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank: [ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [ ] Outdoors [X] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank.

[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through of this item.

a) Type of vapor control system Bubble Cap Tower
Manufacturer Custom Make or model N/A
Date installed (month and year) 1954

b) Date tank was equipped with or vented to vapor control system (month & year) UNK

c) Specify the rate of emission or percent control (by weight) for any pollutants be controlled: NOx 88.9% (DATA PREVIOUSLY SUBMITTED)
(Attach calculations and test data to support response, unless previously submitted)

0009

DOE - FEMP
(Facility Name)
D1-11 (FEMP 2-011)
(tank identification)

11. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~9.0 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution 0.29 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1987

g) Annual throughput of material: 600,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 17, 1993

Storage Tank
Emission Report
Thursday, September 16 1993

10:25 AM

---- Tank Characteristics ----

Identification

Identification No.:	T022
City:	Dayton
State:	Ohio
Company:	DOE FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	12
Diameter (ft):	7
Liquid Height (ft):	12
Volume (gallons):	3300
Turnovers:	180
Net Throughput (gal/yr):	600000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

9

4799

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	0.00
Vapor Space Volume =	0.00
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	1.000000
Total Standing Losses =	0.00

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	600000
Liquid Volume (cubic feet) =	462
Turnovers =	174
Turnover Factor =	0.3394
Working Loss Product Factor =	1.00
Total Working Losses =	19.83

---- Storage Tank Total Losses (AP-42) ----
Total losses = 19.83 lbs/year

0012

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{19.83 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 1.19 \text{ E-7 lb U/year}$

Maximum Emissions: 1.19 E-7 lb U/year x 5 = 5.95 E-7 lb U/year

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE AN AIR CONTAMINANT SOURCE

4799

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45239-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T023
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank F1-1

3. Your identification for Source (same as used on appendix): FEMP # 2-012

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature*
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0014

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____
Application No._____/_____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T
FEMP ID NO. 02-

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F1-1 (FEMP 2-012) EP2-004 Date Installed 1952 (month/year)

2. Tank capacity: 3,300 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 7'6" Height 10' Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank: [ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [ ] Outdoors [X] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank.

[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through of this item.

a) Type of vapor control system Bubble Cap Tower
Manufacturer Custom Make or model N/A
Date installed (month and year) 1954

b) Date tank was equipped with or vented to vapor control system (month & year) UNK

c) Specify the rate of emission or percent control (by weight) for any pollutants be controlled: NOx 88.9% (DATA PREVIOUSLY SUBMITTED)
(Attach calculations and test data to support response, unless previously submitted)

0015

DOE - ~~FEMP~~ 4799
(Facility Name)
F1-1 (FEMP 2-012)
(tank identification)

1. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

2. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~9.0 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution essentially water) 0.29 psia at maximum storage temperature

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) *Indicate the year (or 12-month period) for item (g):* 1987

g) Annual throughput of material: 600,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 17, 1993

0016

Storage Tank
Emission Report
Thursday, September 16 1993

10:26 AM

---- Tank Characteristics ----

Identification

Identification No.:	T023
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	10
Diameter (ft):	8
Liquid Height (ft):	9
Volume (gallons):	3300
Turnovers:	182
Net Throughput (gal/yr):	600000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

4799

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	1.00
Vapor Space Volume =	50.27
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	0.988100
Total Standing Losses =	0.60

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	600000
Liquid Volume (cubic feet) =	452
Turnovers =	177
Turnover Factor =	0.3359
Working Loss Product Factor =	1.00
Total Working Losses =	19.63

---- Storage Tank Total Losses (AP-42) ----
Total losses = 20.23 lbs/year

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{20.23 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 1.21 \text{ E-7 lb U/year}$

Maximum Emissions: 1.21 E-7 lb U/year x 5 = 6.07 E-7 lb U/year

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE AN AIR CONTAMINANT SOURCE

4799

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45239-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T024
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
_____ Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix _____
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank F1-2
3. Your identification for Source (same as used on appendix): FEMP # 2-013

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0020

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____
Application No._____/_____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T024
FEMP ID NO. 02-013

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F1-2 (FEMP 2-013) / EP2-005 Date Installed 1952 (month/year)

2. Tank capacity: 3,300 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 7' Height 11'6" Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank: [ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [ ] Outdoors [X] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank. N/A

[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.

a) Type of vapor control system Bubble Cap Tower
Manufacturer Custom Make or model N/A
Date installed (month and year) 1954

b) Date tank was equipped with or vented to vapor control system (month & year) UNK

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: Nox 88.9% (DATA PREVIOUSLY SUBMITTED)
(Attach calculations and test data to support response, unless previously submitted)

021

DOE - FEMP 4799.
(Facility Name)
F1-2 (FEMP 2-013)
(tank identification)

11. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~9.0 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution 0.29 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1987

g) Annual throughput of material: 600,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 17, 1993

0022

Storage Tank
Emission Report
Thursday, September 16 1993

10:26 AM

---- Tank Characteristics ----

Identification

Identification No.:	T024
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	10
Diameter (ft):	8
Liquid Height (ft):	9
Volume (gallons):	3300
Turnovers:	182
Net Throughput (gal/yr):	600000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

4799

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	1.00
Vapor Space Volume =	50.27
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	0.988100
Total Standing Losses =	0.60

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	600000
Liquid Volume (cubic feet) =	452
Turnovers =	177
Turnover Factor =	0.3359
Working Loss Product Factor =	1.00
Total Working Losses =	19.63

---- Storage Tank Total Losses (AP-42) ----
Total losses = 20.23 lbs/year

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{20.23 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 1.21 \text{ E-7 lb U/year}$

Maximum Emissions: 1.21 E-7 lb U/year x 5 = 6.07 E-7 lb U/year

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE AN AIR CONTAMINANT SOURCE

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45239-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T025
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank F1-25
3. Your identification for Source (same as used on appendix): FEMP # 2-014

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0026

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____
Application No._____/_____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T0
FEMP ID NO. 02-0

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F1-25 (FEMP 2-014) EP2-006 Date Installed 1952 (month/year)

2. Tank capacity: 23,500 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular [ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 14'6" Height 19' Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [ ] Outdoors [X] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank. N

[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (of this item.

a) Type of vapor control system Bubble Cap Tower
Manufacturer Custom Make or model N/A
Date installed (month and year) 1954

b) Date tank was equipped with or vented to vapor control system (month & year) UNK

c) Specify the rate of emission or percent control (by weight) for any pollutants bei controlled: NOx 88.9% (DATA PREVIOUSLY SUBMITTED)
(Attach calculations and test data to support response, unless previously submitted)

0027

DOE - FEMP
(Facility Name)
F1-25 (FEMP 2-014)
(tank identification)

1. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

2. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~9.0 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution 0.29 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1987

g) Annual throughput of material: 600,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 19, 1993

C028

Storage Tank
Emission Report
Thursday, September 16 1993

10:58 AM

---- Tank Characteristics ----

Identification

Identification No.:	T025
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	19
Diameter (ft):	15
Liquid Height (ft):	18
Volume (gallons):	23500
Turnovers:	26
Net Throughput (gal/yr):	600000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	1.00
Vapor Space Volume =	176.71
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	0.988100
Total Standing Losses =	2.11

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	600000
Liquid Volume (cubic feet) =	3181
Turnovers =	25
Turnover Factor =	1.0000
Working Loss Product Factor =	1.00
Total Working Losses =	58.43

---- Storage Tank Total Losses (AP-42) ----
Total losses = 60.55 lbs/year

4799

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{60.55 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 3.63 \text{ E-7 lb U/year}$

Maximum Emissions: 3.63 E-7 lb U/year x 5 = 1.82 E-6 lb U/year

0031

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

-798

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45239-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T026
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank F1-26

3. Your identification for Source (same as used on appendix): FEMP # 2-015

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0032

FOR OFFICIAL USE ONLY

Premise No.___/___/___/4799
Source No.___/___
Application No.____/____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 TO
FEMP ID NO. 02-0

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F1-26 (FEMP 2-015) EP2-007 Date Installed 1952 (month/year)

2. Tank capacity: 23,500 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular [ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 14'6" Height 19' Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [ ] Outdoors [X] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank. N

[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (of this item.

a) Type of vapor control system Bubble Cap Tower
Manufacturer Custom Make or model N/A
Date installed (month and year) 1954

b) Date tank was equipped with or vented to vapor control system (month & year) UNK

c) Specify the rate of emission or percent control (by weight) for any pollutants be controlled: NOx 88.9% (DATA PREVIOUSLY SUBMITTED)
(Attach calculations and test data to support response, unless previously submitted)

0033

DOE - FEMP
(Facility Name)
F1-26 (FEMP 2-015)
(tank identification)

4799

11. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~9.0 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution 0.29 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1987

g) Annual throughput of material: 600,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 19, 1993

0034

4799

Storage Tank
Emission Report
Thursday, September 16 1993

10:58 AM

---- Tank Characteristics ----
Identification

Identification No.:	T026
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	19
Diameter (ft):	15
Liquid Height (ft):	18
Volume (gallons):	23500
Turnovers:	26
Net Throughput (gal/yr):	600000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

4799

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	1.00
Vapor Space Volume =	176.71
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	0.988100
Total Standing Losses =	2.11

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	600000
Liquid Volume (cubic feet) =	3181
Turnovers =	25
Turnover Factor =	1.0000
Working Loss Product Factor =	1.00
Total Working Losses =	58.43

---- Storage Tank Total Losses (AP-42) ----
Total losses = 60.55 lbs/year

0036

4799

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{60.55 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 3.63 \text{ E-7 lb U/year}$

Maximum Emissions: 3.63 E-7 lb U/year x 5 = 1.82 E-6 lb U/year

0037

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4799

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45239-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T027
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
_____ Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix _____
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank F2E-9
3. Your identification for Source (same as used on appendix): FEMP # 2-016

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

4799

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____
Application No._____/_____

DOE - FEMP
(Facility Name
OEPA NO 1431110128 T
FEMP ID NO. 02-

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F2E-9 (FEMP 2-016) EP2-008 Date Installed 1952 (month/year)

2. Tank capacity: 2,500 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular [ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 6' Height 12' Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [ ] Outdoors [X] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank.
N/A Tank is not painted
[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through of this item. N/A

a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____

b) Date tank was equipped with or vented to vapor control system (month & year) N/A

c) Specify the rate of emission or percent control (by weight) for any pollutants be controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

0039

DOE - FEMP
(Facility Name)
4799 F2E-9 (FEMP 2-016)
(tank identification)

11. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~9.0 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution 0.29 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1987

g) Annual throughput of material: 100,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 19, 1993

0040

4799

Storage Tank
Emission Report
Thursday, September 16 1993

10:59 AM

---- Tank Characteristics ----

Identification

Identification No.:	T027
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	12
Diameter (ft):	6
Liquid Height (ft):	12
Volume (gallons):	2500
Turnovers:	40
Net Throughput (gal/yr):	100000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

4799

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	0.00
Vapor Space Volume =	0.00
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	1.000000
Total Standing Losses =	0.00

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	100000
Liquid Volume (cubic feet) =	339
Turnovers =	39
Turnover Factor =	0.9282
Working Loss Product Factor =	1.00
Total Working Losses =	9.04

---- Storage Tank Total Losses (AP-42) ----
Total losses = 9.04 lbs/year

4799

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{9.04 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 5.42 \text{ E-8 lb U/year}$

Maximum Emissions: $5.42 \text{ E}^{-8} \text{ lb U/year} \times 5 = 2.71 \text{ E}^{-7} \text{ lb U/year}$

0043

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4799

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45239-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T102
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank F1-405
3. Your identification for Source (same as used on appendix): FEMP # 2-151

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0044

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/___
Application No.___/____
4799

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T102
FEMP ID NO. 02-151

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F1-405 (FEMP 2-151) EP2-128 Date Installed 1952 (month/year)

2. Tank capacity: 5,800 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 9' Height 12' Length N/A Width N/A

Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank: [ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [X] Outdoors [ ] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank. N/A
N/A: Stainless steel tank, not painted
[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor N/A

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item. N/A

a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____

b) Date tank was equipped with or vented to vapor control system (month & year) N/A

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

0045

DOE - FEMP
(Facility Name)
F1-405 (FEMP 2-151)
(tank identification)

11. Complete the table below for any pressure or vacuum relief vent valve. ~~N/A~~ 4799

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~10.5 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution 0.29 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1983

g) Annual throughput of material: 1,250,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 17, 1993

0046

4799

Storage Tank
Emission Report
Thursday, September 16 1993

11:03 AM

---- Tank Characteristics ----

Identification

Identification No.:	T102
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	12
Diameter (ft):	9
Liquid Height (ft):	12
Volume (gallons):	5800
Turnovers:	216
Net Throughput (gal/yr):	1250000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

SPUC 0047

4799

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	0.00
Vapor Space Volume =	0.00
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	1.000000
Total Standing Losses =	0.00

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	1250000
Liquid Volume (cubic feet) =	763
Turnovers =	219
Turnover Factor =	0.3037
Working Loss Product Factor =	1.00
Total Working Losses =	36.98

---- Storage Tank Total Losses (AP-42) ----
Total losses = 36.98 lbs/year

4799

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{36.98 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 2.22 \text{ E-7 lb U/year}$

Maximum Emissions: 2.22 E-7 lb U/year x 5 = 1.11 E-6 lb U/year

UGU

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4799

D.O.E.-Fernald Environmental Management Project Facility Name	Mr. Stephen M. Beckman Person to Contact
7400 Willey Road Facility Address	Post Office Box 398704 Mailing Address
Fernald Hamilton 45030 City County Zip	Cincinnati OH 45239-8705 City State Zip
513/ 738-6502 Telephone Area Number	513/ 738-6502 Telephone
#1431110128-T103 (Application no., if this is a renewal application)	4953 Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_ Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix _____
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank F3E-404
3. Your identification for Source (same as used on appendix): FEMP # 2-153

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen Beckman
Authorized Signature*
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0050

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____
Application No._____/_____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T103
FEMP ID NO. 02-153

APPENDIX E-2

4799

INORGANIC MATERIAL STORAGE TANK OR STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F3E-404 (FEMP 2-153) EP2-131 Date Installed 1952 (month/year)

2. Tank capacity: 5,800 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular [ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 9' Height 12' Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank:
   [ ] External floating roof tank
   [ ] Internal floating roof tank
   [X] Fixed roof tank
   [ ] Vertical cylindrical tank
   [ ] Horizontal cylindrical tank
   [ ] Pressure tank
   [ ] Other, specify _____

7. Location of tank: [X] Outdoors [ ] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank. N/A
   N/A: Stainless steel tank, not painted
   [ ] Aluminum (specular) [ ] Light gray [ ] White
   [ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

   Condition of paint: [ ] Good [ ] Poor N/A

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item. N/A

    a) Type of vapor control system _____
    Manufacturer _____ Make or model _____
    Date installed (month and year) _____

    b) Date tank was equipped with or vented to vapor control system (month & year) N/A

    c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
    (Attach calculations and test data to support response, unless previously submitted)

DOE - FEMP
(Facility Name)
F3E-404 (FEMP 2-153)
(tank identification)

4799

11. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~10.5 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution essentially water) 0.29 psia at maximum storage temperature

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1983

g) Annual throughput of material: 1,250,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 17, 1993

0052

4799

Storage Tank
Emission Report
Thursday, September 16 1993

11:03 AM

---- Tank Characteristics ----
Identification
Identification No.:	T103
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters
Type of Tank:	Vertical Fixed Roof

Tank Dimensions
Shell Height (ft):	12
Diameter (ft):	9
Liquid Height (ft):	12
Volume (gallons):	5800
Turnovers:	216
Net Throughput (gal/yr):	1250000

Roof Characteristics
Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics
Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings
Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----
Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

4799

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	0.00
Vapor Space Volume =	0.00
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	1.000000
Total Standing Losses =	0.00

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	1250000
Liquid Volume (cubic feet) =	763
Turnovers =	219
Turnover Factor =	0.3037
Working Loss Product Factor =	1.00
Total Working Losses =	36.98

---- Storage Tank Total Losses (AP-42) ----
Total losses = 36.98 lbs/year

4799

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{36.98 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 2.22 \text{ E-7 lb U/year}$

Maximum Emissions: 2.22 E-7 lb U/year x 5 = 1.11 E-6 lb U/year

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

99

D.O.E.-Fernald Environmental Management Project Facility Name	Mr. Stephen M. Beckman Person to Contact
7400 Willey Road Facility Address	Post Office Box 398704 Mailing Address
Fernald Hamilton 45030 City County Zip	Cincinnati OH 45239-8705 City State Zip
513/ 738-6502 Telephone Area Number	513/ 738-6502 Telephone
#1431110128-T104 (Application no., if this is a renewal application)	4953 Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
_____ Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix _____
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Uranyl Nitrate Storage Tank F3E-405
3. Your identification for Source (same as used on appendix): FEMP # 2-154

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature*
For Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____
Application No.____/____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T104
FEMP ID NO. 02-154

4799

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F3E-405 (FEMP 2-154) EP2-130 Date Installed 1952 (month/year)

2. Tank capacity: 5,800 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify _____

4. Tank dimensions: Diameter 9' Height 12' Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank: [ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [X] Outdoors [ ] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank. N/A
N/A: Stainless steel tank, not painted
[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor N/A

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.

a) Type of vapor control system Nitric Acid Recovery Tower
Manufacturer Custom Make or model N/A
Date installed (month and year) 1954

b) Date tank was equipped with or vented to vapor control system (month & year) N/A

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: 88.9% (DATA PREVIOUSLY SUBMITTED)
(Attach calculations and test data to support response, unless previously submitted)

0057

DOE - FEMP
4799 (Facility Name)
F3E-405 (FEMP 2-154)
(tank identification)

1. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

2. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name N/A
Density: ~10.5 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
(Aqueous Solution 0.29 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1983

g) Annual throughput of material: 2,500,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 17, 1993

0058

4799

Storage Tank
Emission Report
Thursday, September 16 1993

11:03 AM

---- Tank Characteristics ----
Identification

Identification No.:	T104
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	12
Diameter (ft):	9
Liquid Height (ft):	12
Volume (gallons):	5800
Turnovers:	216
Net Throughput (gal/yr):	1250000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

0059

4799

Speciation Option: None
Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	0.00
Vapor Space Volume =	0.00
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	1.000000
Total Standing Losses =	0.00

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	1250000
Liquid Volume (cubic feet) =	763
Turnovers =	219
Turnover Factor =	0.3037
Working Loss Product Factor =	1.00
Total Working Losses =	36.98

---- Storage Tank Total Losses (AP-42) ----
Total losses = 36.98 lbs/year

4799

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{36.98 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 2.22 \text{ E-7 lb U/year}$

Maximum Emissions: 2.22 E-7 lb U/year x 5 = 1.11 E-6 lb U/year

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4799

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45239-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T106
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix _____
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Pilot Plant Sump Accumulator Storage Tank (F101)
3. Your identification for Source (same as used on appendix): FEMP # 13-004

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen Beckman, for
Authorized Signature*
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

00623

FOR OFFICIAL USE ONLY 4799

Premise No.___/___/___/____
Source No.___/____
Application No._____/_____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T106
FEMP ID NO. 13-004

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F101 (FEMP 13-004) Date Installed 1952 (month/year)

2. Tank capacity: 7,833 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 10' Height 16' Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank: [ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [X] Outdoors [ ] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank.
N/A Tank is not painted
[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item. N/A

a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____

b) Date tank was equipped with or vented to vapor control system (month & year) N/A

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

0063

4799

DOE - FEMP
(Facility Name)
F101 (FEMP 13-004)
(tank identification)

1. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

2. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Rainwater/Spillwater Trade Name N/A
Density: 8.34 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.43 psia at average storage temperature
(Aqueous Solution 0.43 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): Jun 87 - Jun 88

g) Annual throughput of material: 500,000 gallons.

Completed by Ervin Fisher, Jr. Date Aug. 19, 1993

0064

A799

Storage Tank
Emission Report
Monday, September 13 1993

9:17 AM

---- Tank Characteristics ----

Identification

Identification No.:	T106
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	16
Diameter (ft):	10
Liquid Height (ft):	14
Volume (gallons):	7833
Turnovers:	64
Net Throughput (gal/yr):	500000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

Speciation Option: None
Chemical Liquid: Sump Water

Vapor Pressure of total mixture =	0.430000
Minimum Vapor Pressure of total mixture =	0.430000
Maximum Vapor Pressure of total mixture =	0.430000
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.000000

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	2.00
Vapor Space Volume =	157.08
Vapor Density =	0.0014
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.037217
Vented Vapor Saturation Factor =	0.956407
Total Standing Losses =	2.85

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	500000
Liquid Volume (cubic feet) =	1100
Turnovers =	61
Turnover Factor =	0.6602
Working Loss Product Factor =	1.00
Total Working Losses =	60.84

---- Storage Tank Total Losses (AP-42) ----
Total losses = 63.69 lbs/year

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Rainwater/Spillwater is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{63.69 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 3.82 \text{ E-7 lb U/year}$

Maximum Emissions: $3.82\ E^{-7}$ lb U/year x 5 = $1.91\ E^{-6}$ lb U/year

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE AN AIR CONTAMINANT SOURCE

4798

D.O.E.-Fernald Environmental Management Project Facility Name	Mr. Stephen M. Beckman Person to Contact
7400 Willey Road Facility Address	Post Office Box 398704 Mailing Address
Fernald Hamilton 45030 City County Zip	Cincinnati OH 45239-8705 City State Zip
513/ 738-6502 Telephone Area Number	513/ 738-6502 Telephone
#1431110128-T107 (Application no., if this is a renewal application)	4953 Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
_____ Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix _____
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Pilot Plant Sump Accumulator Storage Tank F100
3. Your identification for Source (same as used on appendix): FEMP # 13-003

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature
for Kenneth L. Alkema
Vice President Regulatory Programs
Title

7/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

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4799

FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____
Application No._____/_____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T107
FEMP ID NO. 13-003

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number F100 (FEMP 13-003) Date Installed 1952 (month/year)

2. Tank capacity: 7,833 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 10' Height 16' Length N/A Width N/A

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify Stainless Steel

6. Type of tank: [ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [X] Outdoors [ ] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank.
N/A Tank is not painted
[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item. N/A

a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____

b) Date tank was equipped with or vented to vapor control system (month & year) N/A

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

0069

DOE - FEMP
(Facility Name)
F100 (FEMP 13-003)
(tank identification)
4799

1. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

2. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Rainwater/Spillwater Trade Name N/A
Density: 8.34 lbs/gal or _____ ° API Producer N/A

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.43 psia at average storage temperature
(Aqueous Solution 0.43 psia at maximum storage temperature
essentially water)

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [ ] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): Jun 87 - Jun 88

g) Annual throughput of material: 500,000 gallons.

ompleted by Ervin Fisher, Jr. Date Aug. 19, 1993

0070

4799

Storage Tank
Emission Report
Monday, September 13 1993

9:17 AM

---- Tank Characteristics ----

Identification

Identification No.:	T107
City:	Dayton
State:	Ohio
Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	16
Diameter (ft):	10
Liquid Height (ft):	14
Volume (gallons):	7833
Turnovers:	64
Net Throughput (gal/yr):	500000

Roof Characteristics

Roof Type:	Cone
Roof Height (ft):	0.000
Slope (ft/ft):	0.00000
Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular
Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00
Pressure Setting(psig):	0.00

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

Speciation Option: None
Chemical Liquid: Sump Water

4799

Vapor Pressure of total mixture =	0.430000
Minimum Vapor Pressure of total mixture =	0.430000
Maximum Vapor Pressure of total mixture =	0.430000
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.000000

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	2.00
Vapor Space Volume =	157.08
Vapor Density =	0.0014
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.037217
Vented Vapor Saturation Factor =	0.956407
Total Standing Losses =	2.85

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	500000
Liquid Volume (cubic feet) =	1100
Turnovers =	61
Turnover Factor =	0.6602
Working Loss Product Factor =	1.00
Total Working Losses =	60.84

---- Storage Tank Total Losses (AP-42) ----
Total losses = 63.69 lbs/year

URANIUM EMISSIONS

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Rainwater/Spillwater is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Maximum emissions are five times the calculated annual emissions.

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{63.69 \text{ lb water}}{\text{year}} \left| \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \right| = 3.82 \text{ E-7 lb U/year}$

Maximum Emissions: $3.82 \text{ E}^{-7} \text{ lb U/year} \times 5 = 1.91 \text{ E}^{-6} \text{ lb U/year}$

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4799

D.O.E.-Fernald Environmental Management Project
Facility Name

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45239-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T127
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Methanol Storage Tank

3. Your identification for Source (same as used on appendix): F4
FERMCO Source (46-003)

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Stephen M. Beckman
Authorized Signature
Kenneth L. Alkema
for Vice President Regulatory Programs
Title

9/23/93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

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FOR OFFICIAL USE ONLY

Premise No.___/___/___/____
Source No.___/____
Application No._____/_____

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 ____
FEMP ID NO. __-___

APPENDIX E-1

4799

ORGANIC MATERIAL STORAGE TANK
CAPACITY EQUAL TO OR GREATER THAN 40,000 GALLONS

1. Tank identification: Name or number F4 (46-003) Date Installed 1985 (month/year)

2. Tank capacity: 50,000 gallons or 1190 barrels

3. Tank shape: [ ] Cylindrical [X] Cylindrical with cone roof
[ ] Spherical [ ] Other, specify_____

4. Tank dimensions: Diameter 24' Height 20' Length _____ Width _____

Also, if this is a cylindrical tank with a cone roof, divide overall height into the following: height of cylinder 20' and vertical height of cone roof 2'

5. Tank shell material: [X] Steel [ ] Aluminum [ ] Other, specify_____

6. Type of tank:
[ ] External floating roof tank
[X] Internal floating roof tank
[ ] Fixed roof tank with flexible diaphragm
[ ] Fixed roof tank with vapor control
[ ] Fixed roof tank, above ground and none of the above types
[ ] Lifter roof tank
[ ] Pressure tank
[ ] Underground tank
[ ] Other, specify _____

7. Supplemental data on type of tank:

[ ] Check this box if tank is used to store produced crude oil or condensate prior to custody transfer.
[ ] Check this box if tank was converted from an external floating roof tank to either an internal floating roof tank or a fixed roof tank and provide type and date of conversion _____
[ ] Check this box if tank is heated or insulated and describe _____
_____

8. Type of filling: [ ] Splash [X] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tanks' shell and roof and indicate condition of paint.

Shell: [ ] Aluminum (specular) [ ] Light gray [X] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Roof: [ ] Aluminum (specular) [ ] Light gray [X] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [X] Good [ ] Poor

0. If this tank is an internal or external floating roof tank complete (a) through (g) of this item.

4799

a) Type of floating roof: [ ] Double-deck [ ] Aluminum sandwich panel
[X] Pontoon [ ] Other, specify _____
[ ] Pan-type steel

b) Type of seal between floating roof and tank wall:

[X] Single seal (primary seal only) [ ] Dual seals (primary seal with secondary seal mounted above it)
[ ] Single seal with weather shield (primary seal with weather shield)

c) Primary seal information:

Manufacturer Altech
Make or model Custom Fabricated
Date installed 9/85 (month/year)

Type: [ ] Liquid-mounted, liquid-filled
[ ] Liquid-mounted, resilient foam-filled
[ ] Vapor-mounted, resilient foam-filled
[ ] Mechanical shoe (complete item below)
[X] Flexible wiper
[ ] Other, specify _____

If the primary seal is a mechanical shoe, complete the following:
Vertical length of shoe _____ inches
Vertical length of shoe above liquid surface _____ inches

d) Secondary seal information: N/A

Manufacturer _____
Make or model _____
Date installed _____ (month/year)

Type: [ ] Rim-mounted, flexible wiper
[ ] Rim-mounted, resilient foam-filled
[ ] Shoe-mounted
[ ] Other, specify _____

e) Most recent seal inspection for visible holes, tears or other openings in the seal or fabric:

Seal(s) inspected Primary Seal
Date of inspection March 26, 1993
Inspected by (person and company) Robert Duckworth & Leroy Pennington, FERMCO
Condition of seal(s) [X] Good condition
[ ] Needed repair or replacement, specify type and date of corrective action _____

f) Most recent seal gap measurements:

	Primary Seal	Secondary Seal
Date of measurement	Sept. 5, 1986	N/A
By (person and company)	(J. Leslie, J. Patton, S. Murray - WMCO) B. Scott - RUST	
Width of maximum gap	* inch	N/A inch
Total area of gaps	N/A sq. in.	_____ sq. in.
*No Discernible Gap	_____ sq. in./ft. tank dia	_____ sq. in./ft. tank dia

g) Condition of the interior side of the tank shell:

[X] Little or no rust [ ] Dense rust [ ] Gunite-lined

0076

11. If this is an internal floating roof tank, complete (a) through (f) of this item.

a) Type of roof above floating deck: [ ] Column-supported [X] Self-supporting

b) If roof is column-supported, identify the type of column construction:

[ ] 9-inch by 7-inch built-up columns [ ] Other, identify _____
[ ] 8-inch diameter pipe columns [ ] Unknown

c) Floating deck seam construction:

[X] Welded [ ] Bolted [ ] Other, describe _____

d) If deck seams are bolted, complete (i) or (ii): N/A

(i) [ ] Check if continuous sheet construction and specify width of sheets (e.g., 5 ft, 6 ft, or 7 ft) _____

[ ] Check if panel construction and specify size of rectangular panels (e.g., 5 ft X 7.5 ft, or 5 ft X 12 ft) _____

(ii) Total length of bolted deck seams: _____ ft.
Total area of floating deck: _____ sq. ft.

e) On the blank lines to the left of the various types of floating deck fittings shown below, indicate the number, if any, of each fitting.

Access Hatch (usually one)
1 Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Automatic Gauge Float Well (usually one)
1 Bolted cover, gasketed
_____ Unbolted cover, gasketed
_____ Unbolted cover, ungasketed

Deck Supports (Legs or Hangers
_____ Adjustable
_____ Fixed

Ladder Well (usually one)
_____ Sliding cover, gasketed
_____ Sliding cover, ungasketed

_____ Stub Drains (1-inch diameter; not used on welded contact deck)

Column Wells
_____ Built-up column, gasketed sliding cover
_____ Built-up column, ungasketed sliding cover
_____ Pipe column, flexible fabric sleeve seal
_____ Pipe column, gasketed sliding cover
_____ Pipe column, ungasketed sliding cover

Sample Pipe or Well (usually one)
1 Slotted pipe, gasketed sliding cover
_____ Slotted pipe, ungasketed sliding cover
_____ Sample well, slit fabric seal (10% open area)

Vacuum Breaker (10-inch diameter)
_____ Weighted mechanical actuation, gasketed
_____ Weighted mechanical actuation, ungasketed

f) Are all openings on the floating deck, except stub drains, equipped with a cover, sea or lid which is to be in a closed position at all times except when in actual use fo tank gauging or sampling? [X] Yes [ ] No If no, explain _____

12. If this is an external floating tank, complete (a) through (d) of this item. N/A

4799

a) Type of shell construction: [ ] Welded [ ] Riveted

b) Are all openings in the external floating roof, except automatic bleeder vents, rim space vents, leg sleeves, main roof drains, emergency roof drains and slotted gauging/sampling wells, equipped with both a cover, seal or lid without visible gaps and a projection into the tank below the liquid surface? [ ] Yes [ ] No

If no, explain _____

c) Number of emergency roof drains _____. Is each emergency roof drain equipped with both a projection into the tank below the liquid surface and a slotted membrane fabric cover or other device which covers at least 90% of the area of the opening [ ] Yes [ ] No

d) Is there a slotted gauging/sampling well? [ ] Yes [ ] No

If yes, is it equipped with an object which floats on the liquid surface within the well and which covers at least 90% of the well opening? [ ] Yes [ ] No

13. If this tank is a lifter-roof tank or a fixed floor tank with a flexible diaphragm or is interconnected to any of those types of tank, complete the following: N/A

a) Volume capacity of vapor expansion system: _____ gal or _____ cu ft.

b) Identify all tanks and other vapor sources interconnected to vapor expansion system _____

14. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item. N/A

a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____

b) Date tank was equipped with or vented to vapor control system (month & year) _____

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

15. Complete the table below for any pressure or vacuum relief vent valve. N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

16. Complete (a) and (b) of this item if this tank is subject to the federal New Source Performance Standard under 40 CFR 60, Subpart Kb, "Standards of Performance for Storage Vessels for Volatile Organic Liquids, including Petroleum Liquids Constructed After July 23, 1984"

a) Date of initial fill with petroleum liquid June 1987

b) Was tank out of service for a period of a year or more? [ ] Yes [X] No
If yes, identify the date of subsequent refilling with petroleum liquid after the most recent out-of-service period of a year or more N/A

0078

4799

17. Operational Data (complete (a) through (j) of this item for all materials stored or to stored. Attach additional sheets if necessary.)

a) Material Methanol - 100% Trade Name Methyl Alcohol
Density: 6.6 lbs/gal or _____ ° API Producer Not Known

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressu is not known, write "unknown"):

i.) Actual vapor pressure: 1.17 psia at average storage temperature
1.17 psia at maximum storage temperature

ii.) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid material (If the material is a liquid other than a gasoline, fuel oil kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [X] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] yes [X] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1992

g) Annual throughput of material: 7865 gallons or _____ barre

h) Percent annual throughput by season: Winter 25 Spring 25 Summer 25 Fall 25

i) If this tank is a fixed roof tank, provide the average height of the stored material within the tank during the year: N/A feet.

j) If this tank has a vapor expansion system or vents to a vapor expansion system, prov the total number of transfers into the vapor expansion system for the year:
N/A transfers.

Completed by Ervin Fisher, Jr. Date August 9, 1993

0079

Storage Tank
Emission Report
Monday, September 13 1993

4799

12:55 PM

Identification
- Identification No.: T127
- City: Dayton
- State: Ohio
- Company: DOE-FEMP

Input Parameters
- Type of Tank: Internal Floating Roof

Tank Dimensions
- Diameter (ft): 24
- Volume(gallons): 50000
- Turnovers: 1
- Number of columns: 0
- Column Diameter (in): 0
- Shell Condition: Light Rust
- Paint Color/Shade: White/White
- Paint Condition: Good
- Roof Color/Shade: White/White
- Roof Paint Condition: Good

Rim-Seal System
- Primary Seal: Liquid-mounted
- Secondary Seal:
- Seal Fit:

Deck Characteristics
- Deck Type: Welded
- Deck Fitting Category: Detail

---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.17
Alpha (Roof) =	0.17
Liquid Bulk Temperature (Degrees Fahrenheit) =	51.92
Average Liquid Surface Temperature (Degrees Fahrenheit) =	53.47
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	58.31
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	48.63
Daily Vapor Temperature Range =	19.35

---- Storage Tank Vapor Pressure Information ----
Speciation Option: None
Chemical Liquid: Methyl Alcohol

Vapor Pressure of total mixture = 1.170407

0080

Liquid Density: 6.630000
Vapor Molecular Weight of Mixture = 32.040000

---- Storage Tank Rim Seal Losses ----
Rim seal factor: 3.0000
Product factor: 1.0000
Vapor pressure function: 0.0207
Rim-seal losses: 47.84

---- Storage Tank Withdrawal Losses ----
Throughput (bbl): 1190.48
Clingage factor: 0.0015
Number of columns: 0
Column Diameter: 0.0000
Withdrawal losses: 0.47

Fitting: Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed
Factor: 1.60
Quantity: 1
Fitting: Automatic Gauge Float Well/Bolted Cover, Gasketed
Factor: 5.10
Quantity: 1
Fitting: Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.
Factor: 44.00
Quantity: 1

---- Deck Fitting Losses ----
Fitting Category: Detail
Pressure function = 0.0207
Vapor Molecular Weight = 32.0400
Kc: 1.0000
Deck Fitting factor: 50.7000
Deck Fitting losses: 33.69
Deck Seam losses: 0.00

---- Storage Tank Total Losses (AP-42) ----

Rim-seal Losses:	47.84	
Withdrawal Losses:	0.47	
Deck Fitting Losses:	33.69	
Deck Seam Losses:	0.00	
Total Losses:	82.00	lbs/year

Maximum emissions are five times the calculated annual emissions.

TL * 5 = Max. emission 82 * 5 = 410 lbs/year maximum emission.